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BALLOON FLIGHT RECORD STATUS REPORT

as of 31 December 1961

by

John R. Winckler

COSMIC RAY GROUP

School of Physics

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School of Physics
University of Minnesota

Supported by

National Science Foundation
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Cosmic Ray Group

February 1962

BALLOON FLIGHT RECORD STATUS REPORT

as of 31 December 1961

University of Minnesota, School of Physics
Minneapolis 14, Minnesota

This tabulation is a continuation of three previous status reports.*

Most of the balloon flights during 1961 were conducted at Minneapolis, Minnesota, USA, but field operations were also conducted at Fort Churchill, Manitoba, Canada; Flin Flon, Manitoba, Canada; International Falls, Minnesota; and Waterloo, Iowa. In the present flights we have used mainly the improved standard monitoring equipment which is described in two technical reports of the Cosmic Ray Group, School of Physics, University of Minnesota, entitled "Analysis of Balloon Observations during the April 1960 Solar Cosmic Ray Events" by A. J. Masley, and "A Study of Auroral X-Rays at Minneapolis between 23 August 1959 and 1 August 1960" by T. C. May. During 1961 we have increased the number of studies using scintillation counters to obtain more specific data about the x-rays resulting from the precipitation of electrons on the atmosphere. However, in the scintillator equipment a Geiger counter vertical coincidence telescope was included to give particle information. The standard type of monitoring flights have been flown at least once per week during the entire year. In addition, concentrated flight efforts were made during periods of solar or geomagnetic activity. In particular, simultaneous launchings were conducted between Fort Churchill, Manitoba, and Minneapolis during July and August, 1961.

*Balloon Flight Record and Data Reduction and Analysis, Status Report of 15 February 1959

Balloon Flight Record Status Report as of 31 December 1959

Balloon Flight Record Status Report as of 30 December 1960.

These flights covered almost continuously (with monitoring equipment mainly, but also with some scintillation counters) the interesting cosmic ray events and high solar activity in July 1961.

In September 1961, a special operation was conducted with four launch sites located at Waterloo, Iowa; Minneapolis, Minnesota; International Falls, Minnesota; and Flin Flon, Manitoba, Canada, to study in detail the x-ray behaviour during magnetic storms. Approximately seven sets of four simultaneous flights were made from September 14th to October 1st, and covered the period including one recurrent type of disturbance on September 25th, and the solar cosmic ray event and subsequent magnetic storm on September 28th and October 1st. For the first time (in September 1961), the electron precipitation has been measured simultaneously over the major range of latitude where it occurs, and, also, this has been done with considerable increase in the time resolution--down to 0.1 second with the apparatus. Radioactive layers resulting from the Soviet nuclear tests were measured during September on many occasions. The September flights were carried out in collaboration with the University of California Berkeley group, headed by Dr. Kinsoy Anderson. Anderson's group manned the Flin Flon, Manitoba station which was supported by the Office of Naval Research.

The Table gives the flight number, launch time, launch location, duration, and the type of instrumentation used on each of the flights. The flight duration is measured from launch time. The floating pressure altitude of the current balloon system is 6 mb. In general, the flights attained this altitude about two hours after the stated launch time. The balloons do not always float at a constant altitude however, so that the detailed time-pressure curve for each flight is necessary for final analysis. An index for the types of instruments used is attached at the end of the tabulation.

The Project will endeavor to furnish the original data from these flights if it is needed by qualified scientists. These data are plotted on a standard format except for cases of exceptionally high intensity. The graphs include the readings of the vertical telescopes, the two Geiger counters, and the ionization rate. For the scintillometers, the readings include the counting rate between 20 and 60 kev approximately, the total counting rate above 60 kev, and the vertical coincidence telescope rate. Nuclear emulsions packages are carried on most flights and are analyzed in case an event of special interest occurs. The emulsion analysis is carried out by the Nuclear Emulsion Group, School of Physics, University of Minnesota, by E. P. Ney and Phyllis S. Freier.

Inquiries about this project should be addressed to Professor J. R. Winckler, School of Physics, University of Minnesota, Minneapolis 14, Minnesota.

<u>Flight No.</u>	<u>Launch Time (UT)</u>	<u>Launch Date (UT)</u>	<u>Launch Location</u>	<u>Flight Duration (Launch to Termination)</u>	<u>Instrumentation</u>
195	0340	7 Jan 1961	Minneapolis	>5 hrs 43 min	Standard
196	0108	17 Jan 1961	Minneapolis	18 hrs 53 min	Standard
197	0258	21 Jan 1961	Minneapolis	>9 hrs 12 min	Standard
198	0312	31 Jan 1961	Minneapolis	>5 hrs 18 min	Standard
199	0746	4 Feb 1961	Minneapolis	7 hrs 50 min	Standard
207	2345	4 Feb 1961	Minneapolis	>6 hrs 15 min	Standard
208S	0841	5 Feb 1961	Minneapolis	8 hrs 27 min	SCI, ST
209	0328	14 Feb 1961	Minneapolis	9 hrs 12 min	Standard
210S	0233	18 Feb 1961	Minneapolis	20 hrs 8 min	SCI, ST
211	0212	25 Feb 1961	Minneapolis	>15 hrs 44 min	Standard
212	0025	4 March 1961	Minneapolis	>9 hrs 5 min	Standard
213	0325	11 March 1961	Minneapolis	>7 hrs 5 min	Standard
214	0038	15 March 1961	Minneapolis	>9 hrs 22 min	Standard
215	0214	17 March 1961	Minneapolis	9 hrs 46 min	Standard
216	0415	23 March 1961	Minneapolis	>11 hrs 5 min	Standard
217		27 March 1961	Minneapolis	Negligible	Standard
218	0406	28 March 1961	Minneapolis	>7 hrs 1 min	Standard
219	0112	29 March 1961	Minneapolis	14 hrs 53 min	Standard
220	0209	30 March 1961	Minneapolis	>25 hrs 51 min	Standard
221S	0141	31 March 1961	Minneapolis	>26 hrs 14 min	SCI, ST
222	0235	1 April 1961	Minneapolis	24 hrs 3 min	Standard
223	0202	8 April 1961	Minneapolis	>19 hrs 35 min	Standard
224	0231	13 April 1961	Minneapolis	>18 hrs 18 min	Standard
225S	0133	15 April 1961	Minneapolis	17 hrs 51 min	SCI, ST
226	0140	22 April 1961	Minneapolis	>20 hrs 10 min	Standard

<u>Flight No.</u>	<u>Launch Time (UT)</u>	<u>Launch Date (UT)</u>	<u>Launch Location</u>	<u>Hours Duration (Launch to Termination)</u>	<u>Instrumentation</u>
227	0207	28 April 1961	Minneapolis	>21 hrs 58 min	Standard
228	0120	29 April 1961	Minneapolis	14 hrs 46 min	Standard
229	0146	6 May 1961	Minneapolis	24 hrs 1 min	Standard
230	0004	29 March 1961	Iowa City, Iowa	15 hrs 16 min	Standard
231	0048	30 March 1961	Iowa City, Iowa	>16 hrs 52 min	Standard
232	0030	31 March 1961	Iowa City, Iowa	14 hrs 00 min	SCI, GT
233	0100	7 May 1961	Minneapolis	20 hrs 37 min	Standard
234	0139	10 May 1961	Minneapolis	>29 hrs 11 min	Standard
235	0144	12 May 1961	Minneapolis	21 hrs 21 min	Standard
236	0133	13 May 1961	Minneapolis	20 hrs 22 min	Standard
237	0105	20 May 1961	Minneapolis	20 hrs 43 min	Standard
238	0116	27 May 1961	Minneapolis	>19 hrs 34 min	Standard

<u>Flight No.</u>	<u>Launch Time (UT)</u>	<u>Launch Date (UT)</u>	<u>Launch Location</u>	<u>Hours Duration (Launch to Termination)</u>	<u>Instrumentation</u>
239	0151	3 June 1961	Minneapolis	>15 hrs 48 min	Standard
240	0130	6 June 1961	Minneapolis	13 hrs 22 min	Standard
241S	1713	9 June 1961	Minneapolis	>10 hrs 59 min	SCI, GT
242	0555	10 June 1961	Minneapolis	>12 hrs 05 min	Standard
243	0553	15 June 1961	Minneapolis	>15 hrs 37 min	Standard
244	0145	16 June 1961	Minneapolis	13 hrs 03 min	Standard
245	0225	17 June 1961	Minneapolis	>10 hrs 35 min	Standard
246	0151	22 June 1961	Minneapolis	>11 hrs 09 min	Standard
247	0155	30 June 1961	Minneapolis	>10 hrs 35 min	Standard
248	0157	4 July 1961	Minneapolis	10 hrs 07 min	Standard
249	0150	6 July 1961	Minneapolis	>8 hrs	Standard
250	0157	11 July 1961	Minneapolis	8 hrs 46 min	Standard
251	0136	12 July 1961	Minneapolis	11 hrs 48 min	Standard
252	1645	12 July 1961	Minneapolis	9 hrs 15 min	SCI, GT
253	0232	13 July 1961	Minneapolis	Negligible	Standard
254	0540	13 July 1961	Minneapolis	>12 hrs	Standard
255	1859	13 July 1961	Minneapolis	>12 hrs	SCI, SC
256	2103	13 July 1961	Minneapolis	13 hrs 22 min	Standard
257	0935	14 July 1961	Minneapolis	>11 hrs 55 min	Standard
258	0132	15 July 1961	Minneapolis	>10 hrs 48 min	SCI, GT
259	2104	15 July 1961	Minneapolis	11 hrs 52 min	Standard
260	0132	18 July 1961	Minneapolis	>12 hrs 28 min	Standard
261	1556	18 July 1961	Minneapolis	9 hrs 31 min	Standard
262	2337	18 July 1961	Minneapolis	Negligible	Standard
263	0507	19 July 1961	Minneapolis	11 hrs 47 min	Standard
264	0224	20 July 1961	Minneapolis	>12 hrs	Standard

<u>Flight No.</u>	<u>Launch Time (UT)</u>	<u>Launch Date (UT)</u>	<u>Launch Location</u>	<u>Hours Duration (Launch to Termination)</u>	<u>Instrumentation</u>
265	2211	20 July 1961	Minneapolis	Negligible	Standard
266	0206	21 July 1961	Minneapolis	Quit	Standard
267	0914	26 July 1961	Minneapolis	>11 hrs 16 min	Standard
268	0133	27 July 1961	Minneapolis	>11 hrs 57 min	Standard
269	0236	29 July 1961	Minneapolis	12 hrs 35 min	Standard
270	0637	2 Aug 1961	Minneapolis	11 hrs 53 min	Standard
271	0137	3 Aug 1961	Minneapolis	10 hrs 32 min	Standard
272	0116	10 Aug 1961	Minneapolis	11 hrs 44 min	Standard
273	0101	18 Aug 1961	Minneapolis	>16 hrs 59 min	Standard
274	0057	24 Aug 1961	Minneapolis	18 hrs 25 min	Standard
275	0056	30 Aug 1961	Minneapolis	>6 hrs 34 min	Standard

<u>Flight No.</u>	<u>Launch Time (UT)</u>	<u>Launch Date (UT)</u>	<u>Launch Location</u>	<u>Hours Duration (Launch to Termination)</u>	<u>Instrumentation</u>
276	0100	6 Sept 1961	Minneapolis	17 hrs 5 min	Standard
277	0112	9 Sept 1961	Minneapolis	16 hrs 18 min	Standard
278	0208	15 Sept 1961	Minneapolis	>14 hrs 52 min	Standard
279	0043	18 Sept 1961	Minneapolis	>15 hrs 57 min	SCI, GT
280	0130	21 Sept 1961	Minneapolis	>8 hrs 4 min	SCI, GT
281	0048	25 Sept 1961	Minneapolis	12 hrs 59 min	SCI, GT
282	0035	28 Sept 1961	Minneapolis	>11 hrs 15 min	SCI, GT
283	1200	28 Sept 1961	Minneapolis	12 hrs 35 min	SCI, GT
284	0036	29 Sept 1961	Minneapolis	Negligible	Standard
285	0320	29 Sept 1961	Minneapolis	>14 hrs 21 min	Standard
286	0155	1 Oct 1961	Minneapolis	>13 hrs 5 min	SCI, GT
287	0039	7 Oct 1961	Minneapolis	>11 hrs 31 min	Standard
288	2345	18 Sept 1961	Internat'l Fall	15 hrs 43 min	SCI, GT
289	0100	21 Sept 1961	Internat'l Fall	>13 hrs 5 min	SCI, GT
290	0100	25 Sept 1961	Internat'l Fall	>11 hrs 45 min	SCI, GT
291	0100	28 Sept 1961	Internat'l Fall	>13 hrs 43 min	SCI, GT
292	1640	28 Sept 1961	Internat'l Fall	11 hrs 48 min	SCI, GT
293	0130	29 Sept 1961	Internat'l Fall	>11 hrs 30 min	Standard
294	0028	18 Sept 1961	Waterloo, Iowa	17 hrs 5 min	SCI, GT
295	0034	21 Sept 1961	Waterloo, Iowa	Negligible	SCI, GT
296	0034	25 Sept 1961	Waterloo, Iowa	>11 hrs 38 min	SCI, GT
297	0035	28 Sept 1961	Waterloo, Iowa	9 hrs 8 min	SCI, GT
298	1205	28 Sept 1961	Waterloo, Iowa	9 hrs 12 min	SCI, GT
299	0001	29 Sept 1961	Waterloo, Iowa	>13 hrs 29 min	Standard

Flight No.	Launch Time (UT)	Launch Date (UT)	Launch Location	Launch Duration	Termination	Instrumentation
M300	0358	30 June 1961	Ft. Churchill, Man. Canada	>19 hrs 02 min	IC, SC, SC-A, GT	
M301	0427	4 July 1961	Ft. Churchill, Canada	>14 hrs 06 min	IC, SC, SC-A, GT	
M302	0409	6 July 1961	Ft. Churchill, Canada	>16 hrs	IC, SC, SC-A, GT	
M303	0645	8 July 1961	Ft. Churchill, Canada	>14 hrs 45 min	IC, SC, SC-A, GT	
M304		11 July 1961	Ft. Churchill, Canada	Negligible	IC, SC, SC-A, GT	
M305	2037	11 July 1961	Ft. Churchill, Canada	>19 hrs 23 min	IC, SC, SC-A, GT	
M306	0510	12 July 1961	Ft. Churchill, Canada	~ 10 hrs	NE	
M307S	1733	12 July 1961	Ft. Churchill, Canada	>18 hrs 57 min	SCI, GT	
M308	2205	12 July 1961	Ft. Churchill, Canada	>19 hrs 20 min	IC, SC, SC-A, GT	
M309S	2052	13 July 1961	Ft. Churchill, Canada	>16 hrs 38 min	SCI, GT	
M310	1558	14 July 1961	Ft. Churchill, Canada	>17 hrs 02 min	IC, SC, SC-A, GT	
M311	1206	15 July 1961	Ft. Churchill, Canada	Negligible	IC, SC, SC-A, GT	
M312	2122	15 July 1961	Ft. Churchill, Canada	>16 hrs 08 min	IC, SC, SC-A, GT	
M313	1721	16 July 1961	Ft. Churchill, Canada	>19 hrs 39 min	IG, SC, SC-A, GT	
M314	1522	18 July 1961	Ft. Churchill, Canada	>23 hrs 38 min	IC, SC, SC-A, GT	
M315	2204	18 July 1961	Ft. Churchill, Canada	>19 hrs 41 min	IC, SC, SC-A, GT	
M316	1748	19 July 1961	Ft. Churchill, Canada	>19 hrs 12 min	IC, SC, SC-A, GT	
M317	1107	20 July 1961	Ft. Churchill, Canada	>14 hrs 53 min	Flare Unit	
M318	0258	21 July 1961	Ft. Churchill, Canada	>16 hrs 02 min	Flare Unit	
M319	2246	21 July 1961	Ft. Churchill, Canada	>17 hrs 44 min	IC, SC, SC-A, GT	
M320	0437	25 July 1961	Ft. Churchill, Canada	>23 hrs 38 min	Flare Unit	
M321	0437	26 July 1961	Ft. Churchill, Canada	>26 hrs 03 min	IC, SC, SC-A, GT	
M322	2238	28 July 1961	Ft. Churchill, Canada	>19 hrs 22 min	IC, SC, SC-A, GT	
M323	0503	2 Aug 1961	Ft. Churchill, Canada	>19 hrs 37 min	IC, SC, SC-A, GT	
M324	0558	3 Aug 1961	Ft. Churchill, Canada	>15 hrs 30 min	IC, SC, SC-A, GT	
M325	0228	10 Aug 1961	Ft. Churchill, Canada	>50 hrs 32 min	IC, SC, SC-A, GT	
M326	0202	17 Aug 1961	Ft. Churchill, Canada	>52 hrs 58 min	IC, SC, SC-A, GT	
M327	0243	24 Aug 1961	Ft. Churchill, Canada	>51 hrs 04 min	IC, SC, SC-A, GT	

<u>Flight No.</u>	<u>Launch Time (UT)</u>	<u>Launch Date (UT)</u>	<u>Launch Location</u>	<u>Duration (Launch to Termination)</u>	<u>Instrumentation</u>
328	0323	1 Oct 1961	Waterloo, Iowa	3 hrs 14 min	SCI, GT
329	0907	1 Oct 1961	Waterloo, Iowa	11 hrs 3 min	Standard
330	0050	30 Sept 1961	Int'l Falls, Minn.	>1 hr 48 min	Standard
331	0130	1 Oct 1961	Int'l Falls, Minn	>11 hrs 57 min	SCI, GT
332			Flin Flon, Manitoba		Standard
333	~ 0210	1 Oct 1961	Flin Flon, Manitoba	>11 hrs 20 min	SCI, GT
334	0050	14 Oct 1961	Minneapolis	9 hrs 53 min	Standard
335	0019	27 Oct 1961	Minneapolis	>9 hrs 41 min	SCI, GT
336	0042	29 Oct 1961	Minneapolis	>11 hrs 48 min	SCI, GT
337	0003	4 Nov 1961	Minneapolis	>5 hrs 27 min	Standard
338	0145	8 Nov 1961	Minneapolis	5 hrs 58 min	Standard
339	0106	11 Nov 1961	Minneapolis	10 hrs 12 min	Standard
340	0107	18 Nov 1961	Minneapolis	>11 hrs 53 min	Standard
341	0002	25 Nov 1961	Minneapolis	>18 hrs 18 min	Standard
342	0106	2 Dec 1961	Minneapolis	>4 hrs 34 min	Standard
343	0328	3 Dec 1961	Minneapolis	>3 hrs 32 min	Standard
344	0309	16 Dec 1961	Minneapolis	>4 hrs 21 min	Standard
345	0300	23 Dec 1961	Minneapolis	>4 hrs 00 min	Standard
346	0301	29 Dec 1961	Minneapolis	3 hrs 56 min	Standard

Instrumentation Codes

IC	= Ion Chamber	GT	= Geiger Telescope
SC	= Single Geiger Counter (Brass)	Standard	= IC, SC, SC-A, NE, GT
SC-A	= Single Geiger Counter (Aluminum)		
SC-S	= Single Geiger Counter (Steel)		
NE	= Nuclear Emulsions		
SCI	= Scintillation Counter		
		>	= Termination time not known accurately at time of this report.